

II.—On *Hirudo geometra*, Linn., and some other species of British Freshwater Leeches. By T. BRIGHTWELL of Norwich, F.L.S.

EARLY in March of the present year (1841), about twenty specimens of a small leech were taken from the back fin of a roach caught in the river Wensum. They agreed generically with the characters given by Savigny of his genus *Hæmocharis*, viz. body cylindrical, composed of indistinct articulations, terminated by large flattish circular* discs or suckers; head without any toothed tubercles; eyes four:

These leeches were from one to two inches long, slender, cylindrical, diminishing in size from the tail to the head; anterior disc or sucker smaller than the posterior; colour light brown, with broken rings of a darker colour; posterior disc with eight or nine small dark spots and brown longitudinal streaks. These characters are nearly those of *H. piscium* or *geometra* of authors, the only described species of this genus.

These leeches being placed with a gudgeon in water, instantly attached themselves to the edge of the fins or lip, and remained fixed some days. Being placed by themselves in a glass vessel, and having fresh water put to them every morning, several instances of sexual connexion were observed to take place immediately after the fresh water was added, one of the leeches suddenly twisting itself round the neck of another, and closing upon a longitudinal opening which at this time was very conspicuous in the neck of each. During this union a white substance could be perceived on each side of the part where the bodies were connected. They continued united generally several hours, and in one case during the whole day. When the leeches separated, a white filmy substance was detached from the parts where they had been united, which in one case had the appearance of an egg, but from subsequent observation was found to be part of the film in which the eggs are enveloped.

Within twenty-four hours after the union took place eggs were deposited, and were found firmly attached to the sides of the glass vessel. By an experiment made with a pair which were kept separate for that purpose, twelve eggs were found to proceed from two individuals. These eggs were semitransparent, of a reddish brown colour, oblong-oval, with one end truncated; they were covered with a white filmy web-like secretion, and had longitudinal elevated ridges on the sides. The shells of the eggs were found, on dissection, to be extremely hard.

* Oblique is the character given by Savigny.

On the thirtieth day after the eggs were deposited the first young leech made its appearance. Each egg produced only one leech—this was ascertained by detaching an egg and keeping it in a glass by itself, when one leech only proceeded from it. The young leeches were the size of a small thread, about one-third of an inch long, and appeared perfectly formed; the brown annular markings of the body, the longitudinal lines upon the posterior disc, and the four eyes in the anterior disc or sucker being clearly visible. They were very active and vigorous, and exceedingly beautiful little animals.

One of the young leeches being placed in a small cup of water with a tadpole, instantly fixed itself to the edge of the tadpole's tail, and remained so for some hours; but several tadpoles being placed in the vessel where the young leeches were, they had all disappeared on the following morning, the tadpoles having probably devoured them. The adult leeches all became faint and died, a few days after they had deposited their eggs.

These leeches were rarely, if ever, observed to move in the geometrical manner which is described by Linnæus and others, and from which character the trivial name *geometra* was given to them. Our species all moved in the same manner as the common medicinal leech, and often swam about in the undulating manner of that species. Both the young and the old ones also, frequently, after attaching themselves firmly by the posterior disc only, assumed a rigid appearance, and flung their bodies about as if eagerly seeking some object to fix themselves to, which they did, if any object presented itself, in a moment, and were very difficult to detach.

Cuvier (or rather Latreille), 'Règne Animal,' vol. v. p. 215, describes the genus *Hæmocharis* as *never swimming*; but if our species be of this genus, this must be incorrect. M. de Blainville seems of opinion that the *Hirudo cephalotes* of Carena is of this genus; but this species is not only described as *never swimming*, but also as *viviparous*; characters which will not agree with our species, and from which those in Cuvier and other authors may probably have been taken.

The figure given of *H. geometra* in the 'Encyclopédie Méthodique,' pl. 51. fig. 12—19, which professes to be copied from Rösel, differs much from our species both in the form of the discs or suckers, the situation of the eyes, and the markings.

We add a few general observations on the freshwater leeches occurring in our neighbourhood, *Hæmopsis sanguisorba* (Sav.), the common horse-leech. This species is common in our ponds and ditches. We have not been able to determine

whether it be oviparous or not, though there is little doubt of its being so. We have found its young, in an early stage, in the same places as the adult, but never adhering to the parent. We have in our possession a singular variety of this species, which has the posterior part and a large spot on the abdomen of a pale flesh-colour.

Sanguisuga medicinalis (Sav.), the medicinal leech. This species is occasionally found in our neighbourhood, but is by no means common. A dealer in leeches, residing in Norwich, keeps a stock of about 50,000 leeches in two large tanks of water, floored with soft clay, in which the leeches burrow. On examining these tanks we found many capsules or ova deposits of the leech, which the owner (ignorant of their nature) stated to be, at times, very numerous, but which he had neglected and generally destroyed. The Austrian variety he keeps in a separate tank, as he says it destroys the others.

Nepheleis vulgaris (Sav.). This species abounds in all our fresh waters, and the brown capsules containing its ova may constantly be found on the underside of the leaves of water plants among the ova of the freshwater helices. We have kept several of this species through the summer, and the following are our notes as to the deposit of the ova and the development of the young:—On the 2nd of June *H. vulgaris* deposited one capsule containing ova; on the 5th another; on the 10th another; and on the 15th two more, each of them containing from seven to ten eggs. On the 22nd young appeared in the capsule deposited on the 2nd, and on the 13th of July they emerged from the capsule, so that in three weeks the young were seen alive in the capsule, and in six weeks were fully developed and left the capsule.

Examining the young of this species under a power of about sixty linear, we detected a *Cypris* and four specimens of a common rotiferous animalcule in its stomach, one of the rotifera being still alive.

Nepheleis tessellata? In June last we captured in the river at Costessey in this county a single specimen of a leech which nearly agrees with the descriptions given of this species. It is described by Blainville as follows:—“Body elongated or oval, eighteen lines long, with eight eyes in a double longitudinal series; ash-coloured, with orange or whitish-coloured spots above, the sides marked with white or partly gray and partly orange-coloured spots; the abdomen gray, with two round spots in the middle.”

Our specimen is nearly cylindrical, about an inch long, the posterior disc larger than the anterior; eight eyes, in two rows of four each; colour green, with two indistinct, whitish, lon-

itudinal series of spots above and two spots underneath ; the whole body, magnified, appears studded with small, dark, irregular spots.

Müller says the female is sometimes filled with 300 young ones. The abdomen of our species was, when captured, covered with young, which adhered solely by the posterior disc. We kept this specimen from the 24th of June to the 28th of August, when it died. The young remained attached to the parent during all this time, and we took some pains to ascertain their exact number, and found they amounted to 143. We never saw the parent or the young ones take any food. The young differed altogether in colour from the parent, the latter being a deep green, the former a light ash-colour : the eyes of the parent could scarcely be discerned with a lens ; the eyes of the young were very conspicuous, and could be seen with the naked eye. The motion of this species is geometrical, and it never swims. The abdomen of the parent had no pouch, but was much expanded by the adhesion of so numerous a progeny, so much so as to make the form appear very different to the young.

Clepsina (Sav.). This genus or family of *Hirudinidæ* (which comprises the leeches furnished with a retractile proboscis) does not appear well understood. They are found adhering to the undersides of the leaves of the larger aquatic plants, where the small helices (upon which they feed) abound ; they are also found adhering to stones in running waters. The proboscis is rarely seen exerted.

C. complanata. We have kept many of this species during the whole summer, and never saw the proboscis unless we compelled the animal to protrude it, which it may be made to do by a glass compressor. We have seen it devour one of the common *Planorbis*, which it did by thrusting itself up the shell of the snail and sucking the body of the animal. The five-lobed stomach of the leech and of several young ones adhering to it, were, when it left the shell, filled with a clear dark red fluid, which, contrasting with the transparent straw-colour of the rest of the animal, gave it a very unique and beautiful appearance. The ova of this species are first observed to proceed from the ovary in two longitudinal rows to the abdomen, which is dilated and drawn up into a kind of pouch or bag to receive them. The young are gradually developed, and when excluded remain adhering, by their whole length, for many weeks to the body of the parent.

C. stagnalis. This little species is said to be common, but we have never met with it ; all the leeches we have seen of this family having six eyes, whereas this species is described

as having only two. *C. complanata* varies much in size, and we have seen a specimen full of ova as small as *C. stagnalis* is described to be.

C. hyalina? We have taken a single specimen of a leech of this family, which nearly agrees with the descriptions of this species. It was more than twice as large as any other individual of this family which we have seen, being about an inch long, of a yellow-brown colour, with two rows of longitudinal dark lines upon its back. The whole body was remarkably hard and tough. We saw the proboscis of this animal well developed; it had no ova or young attached to it.

REFERENCE TO PLATE I.

- Fig. 1. *H. geometra*, a pair united, mag. nat. 2. The fore-part of the same, magnified. *a, a.* White substance. 3. Eggs, mag. nat. 4. Young, idem. 5. Eggs, highly magnified (about 150 linear). *b.* Lid of the egg whence the leech escapes. 6. Anterior disc or sucker of the young, free, highly magnified. 8. The same attached. 7. Posterior disc attached.
- Fig. 9, 10, 11. Eggs or capsules with ova of *Nepheleis vulgaris*. 9. Mag. nat. 10, 11. Magnified. 12. The same, the ova near hatching. 13, 14. The same, with the young in the egg just before they come out.
- Fig. 15. *Nepheleis tessellata*? mag. nat., with the young adhering. 16. The same, upper side. 17. One of the young, highly magnified.
- Fig. 18, 19. *Clepsina complanata*, mag. nat., with the ova attached.
- Fig. 20. *C. hyalina*? mag. nat.

III.—*Contributions to the Ichthyology of Australia.* By JOHN RICHARDSON, M.D., F.R.S., &c., Inspector of Hospitals, Haslar.

MR. GOULD having had the kindness to place in my hands for examination a collection of fish, procured by his assistant Mr. Gilbert, at Port Essington, on the north coast of New Holland, I purpose in the following paper to give a summary of my observations thereon, together with a few remarks upon some drawings made by Lieutenant Emery, R.N., of fish captured on the north-west coast of the same country. I shall also introduce several notices of species from Van Diemen's Land and New Zealand, now existing in the museum at Haslar, with the view of enumerating as many Australian fish as the materials in my possession enable me to do.

Mr. Gilbert's specimens, numbered from 1 to 37, are all dried skins of one side of the fish. The colours of most are consequently altered, and in a few instances the vomerine and